CLAIMS

What is claimed is:

1. A method to obtain clear reception of a signal with phase errors, comprising:

receiving a waveform sent from an analog transmitter;

estimating a phase error present in said waveform; and

compensating for said phase error; wherein said phase error is estimated via at least one of a half angle technique, a maximum abscissa technique, and a minimum to maximum envelope ratio technique.

2. The method as claimed in claim 1, wherein said minimum to maximum envelope technique comprises:

determining a minimum envelope value of said waveform;

determining a maximum envelope value of said waveform;

calculating a ratio of the minimum envelope value to the maximum envelope value; and

converting said ratio to a phase error estimate utilizing a curve fitting technique.

3. The method as claimed in claim 2, wherein said curve fitting technique is at least one of a straight line fit and quadratic equation.

4. The method as claimed in claim 2, wherein said curve fitting technique is accomplished using a look-up table.

5. The method as claimed in claim 2, wherein said phase error estimate is computed without quadrature components.

6. The method as claimed in claim 1, wherein said maximum abscissa technique comprises:

determining a maximum abscissa value of said waveform,

finding an index of said maximum abscissa value;

calculating a phase error estimate utilizing an arctangent of an angle formed by a line from an origin through a point on said waveform at said index, said angle being equal to said phase error estimate.

7. The method as claimed in claim 6, further including performing multiple iterations of said maximum abscissa technique to thereby reduce distortion.

8. The method as claimed in claim 6, wherein data produced utilizing said maximum abscissa technique is fit into a quadratic equation suitable for creating a more accurate phase error estimate.

9. The method as claimed in claim 1, wherein said half angle technique comprises:

calculating an envelope of said waveform;

computing an envelope error;

finding indices of intersection;

interpolating an abscissa and an ordinate; and

determining an angle subtended by a line from an origin to an intersection and the closest axis, wherein a phase error estimate is twice said angle.

10. The method as claimed in clam 9, wherein said half angle technique produces an accurate phase error estimate with direct current offset in a quadrature channel.

11. A system for clear receipt of a signal with phase errors, comprising:

a receiver that receives a waveform sent from an analog transmitter;

means for estimating a phase error present in said waveform; and

means for compensating for said phase error; wherein said phase error estimating means performs at least one of a half angle technique, a maximum abscissa technique, and a minimum to maximum envelope ratio technique when estimating said phase error.

12. A method for estimating phase errors present in a signal, comprising:

receiving a waveform sent from an analog transmitter; said

estimating a phase error present in said waveform using at least one of a half angle technique, a maximum abscissa technique, and a minimum to maximum envelope ratio technique.

13. The method as claimed in claim 12 wherein said minimum to maximum envelope technique comprises:

determining a minimum envelope value of said waveform;

determining a maximum envelope value of said waveform;

calculating a ratio of the minimum envelope value to the maximum envelope value; and

converting said ratio to a phase error estimate utilizing a curve fitting technique.

14. The method as claimed in claim 13 wherein said curve fitting technique is at least one of a straight line fit and quadratic equation.

15. The method as claimed in claim 13 wherein said phase error estimate is computed without quadrature components.

16. The method as claimed in claim 12, wherein said maximum abscissa technique comprises:

determining a maximum abscissa value of said waveform;

finding an index of said maximum abscissa value; and

calculating a phase error estimate utilizing an arctangent of an angle formed by a line from an origin through a point on said waveform at said index, said angle being equal to said phase error estimate.

17. The method as claimed in claim 16, further including performing multiple iterations of said maximum abscissa technique to thereby reduce distortion.

18. The method as claimed in claim 16, wherein data produced utilizing said maximum abscissa technique is fit into a quadratic equation suitable for creating a more accurate phase error estimate.

19. The method as claimed in claim 12, wherein said half angle technique comprises:

calculating an envelope of said waveform;

computing an envelope error;

finding indices of intersection;

interpolating an abscissa and an ordinate; and

determining an angle subtended by a line from an origin to an intersection and the closest axis, wherein a phase error estimate is twice said angle.

20. The method as claimed in claim 19, wherein said half angle technique produces an accurate phase error estimate with direct current offset in a quadrature channel.